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REPORT ON MAGNETMETER SURVEY

AT

MELBA FLAT TASMANIA

67_490

149602

ELECTROLYTIC ZINC COMPANY OF AUSTRALASIA LIMITED

50/91

WEST COAST DEPARTMENT

E.L. 2/62

TWB - Marker

Report on Magnetometer Survey at Melba Flat, Tasmania.

67-490

By

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1967

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WEST COAST DEPARTMENT

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ABSTRACT

The magnetometer survey at Melba Flat outlined two anomalies of interest. The two magnetic anomalies obtained, do not resemble (in shape, intensity or extent) the magnetic anomalies obtained in such surrounding mineral areas as Renison Bell or Cuni. However, in an area with such varied economic / magnetic mineral associations, anomalies of the type encountered could be of great importance.

LOCATION AND ACCESS:

The Melba Flat area is situated three miles South-West of the mining township of Renison Bell, on the west-coast of Tasmania.

The base line (00W) of the Survey grid is accessable from the Murchison Highway, but the main area of interest (40W - 100W) is partially accessable along timber-hauling tracks by 4-wheel drive vehicles only.

SURVEY METHODS

The Melba Flat magnetic grid is a Northerly continuation of the Cuni survey area.

Survey lines were spread 500 feet apart, with magnetometer stations every 100 feet. Bearing of the survey lines was approximately W.N.W - E.S.E.

Magnetic readings were taken with a McPhar 500A fluxgate magnetometer which reads vertical magnetic intensity to an accuracy of ± 10 gammas.

The results were plotted as (i) profiles of vertical magnetic intensity, and (ii) a contour plan from traverse 2N to 16S. The contour plan was not extended to the North because of a lack of significant anomalies.

The positions of several traverse lines relative to their plotted position is suspect, because extremes of terrain and vegetation made accurate line surveying impossible.

GEOLOGY OF SURROUNDING AREAS

The Melba Flat survey grid covers an area of Cambrian - Pre-cambrian strata, intruded by a Cambrian Serpentine (or pyroxenite) and also several Cambrian Gabbroic intrusions. In the Renison Bell tin area, there are mineralised Devonian porphyry-granite dykes.

The Cambrian and Pre-Cambrian rocks of the areas are highly faulted and exhibit strong folding to the south of the prospect area. The Dunkley fault has been mapped in surrounding areas as the Cambrian/Pre-cambrian boundary. The Zeehan, 1 mile geological map projects the Dunkley fault through the Melba Flat survey grid on a bearing approximately N.E. - S.W. The validity of such a projection as apparently in doubt.

Cassiterite - pyrrhotite mineralisation associated with the basic dykes of the Renson Bell area has been outlined by the magnetic and S.P. methods. However, the magnetic results in this area, were complicated by the varying nature and attitude of the dykes.

In the Cuni area, Copper-nickel mineralisation was associated with a basic dyke. This ore occurence was investigated by the Bureau of Mineral Resources with E.M. and S.P. methods. The magnetic method was not persisted with, because of a lack of useful results.

The small amount of magnetic surveying in this area showed a nickel - magnetite-mineral association within the serpentine mass.

Thus in areas surrounding the Melba Flat grid, there are three magnetic - economic mineral associations, one of which could be related to magnetic anomalies at Melba Flat.

QUALITATIVE INTERPRETATION.

Qualitative interpretation of the magnetic results indicates the presence of two parallel anomalies trends (A and B), striking in a North west - South east direction. The two anomalies are very similar in shape, intensity and extent, with the south-western anomaly (A) having the greater intensity and strike length. Both anomalies are sharply terminated in their northern extent by an east-west (?) trending anomaly of limited strike length.

The only other prominant magnetic features on the Melba Flat grid are an isolated, strong east-west (?) trending anomaly on line 9 North, and several intense readings (C) in the vicinity of 16S/5W. The latter feature may be assigned to magnetite enrichment in the outcropping Serpentine intrusion.

The above mentioned anomalies are the only significant features of an otherwise relatively undisturbed magnetic field.

The anomalies A and B fall into class 2 of Hoalak's classification of magnetic anomalies. Class 2 anomalies are of the order 1,000 to 10,000 gammas and are considered to be caused by "extensive masses of volcanic or of crystalline rocks rich in magnetite". As the Melba Flat anomalies fall into the lower limits of this class, the magnetite content would not have to be of a large order.

The most notable feature of the two anomalies A and B is their continuity and preservation of shape over a considerable strike length. In this regard they are dissimilar to the magnetic anomalies of Renison Bell (Davidson et. al. 1967), which were discontinuous and varied considerably in shape.

A marked difference in magnetic intensity between these

two areas is also in evidence, with the Renison Bell anomalies being of an order 4 to 5 times greater than the Melba Flat anomalies. For these reasons, the source of the Melba Flat magnetic anomalies A and B is in all probability not the same pyrrhotite - cassiterite bearing basic dykes of the Renison Bell area.

The magnetic survey of the Cuni area, as mentioned above, was inconclusive because of the lack of significant results. This evidence would exclude the Cuni Rock type and mineral association as a source of the Melba Flat anomalies, except that insufficient magnetic data was compiled at Cuni to make such an assumption.

The only other known magnetic rock types that could be a possible source of the Melba Flat anomalies are the Cambrian Gabbros and Serpentine, which outcrop in the near vicinity. The Gabbros however, are not known to occur as sills in the area, but rather as intrusive masses. The serpentine has a known nickel - magnetite association, but this has been observed to produce much stronger magnetic anomalies. However, a low magnetite content, serpentine derivative could possibly be the course material of the Melba Flat magnetic anomalies.

(b) QUANTITATIVE INTERPRETATION

Positioning of drill holes to provide maximum information on the rock types causing magnetic anomalies, necessitates quantitative analysis of the data. For this purpose the method of Cock (1958) has been used to compute magnetic type curves for the general Roseberry area, the method of computation is outlined in an Appendix to this report.

Comparing the observed data to the computed type curves is complicated by the strike of the anomalies being N.W. - S.E. The type curves have been computed for a N - S and E - W strike direction, as these are the simplest cases. The approximation of a

N.–S. strike has been necessary because of the E–W Traverse directions.

Direction of Dip. It is evident from the shape and positions of the magnetic highs and lows, that the anomalous sources are lenticular sheet like bodies dipping to the North–East.

Depth to a point pole (d) may be estimated by assuming a point source for the anomaly, and using the formula (Jakosky, 1957.)

$$d = 1.33\, W1/2$$

where W1/2 is half the width of the anomaly at half-maximum intensity (see fig 2). This depth (d) will be greater than the depth to the top of the source, but it gives an approximate figure that may be used in computations.

Anomaly A was analysed on traverse 1 South, indicating a source with width (W) of 100ft and depth to top of 100ft. The assumed source was centred below 50.75W and dipped to the East at 45°. Drill hole NFP 124 was sited at 58E and drilled to the west to intersect the source at a shallow depth and investigate its composition. However, weathering was found to extend to a depth of 200ft. and no assessment of rock types in this region could be made. A further drill hole was sited at 52W and drilled at 45° to the west, to intersect the source below the effects of weathering action.

To position a drill hole for investigation of anomaly B, traverse lines 5 south and 6 South have been analysed to determine the attitude of its source. The anomalous body has a width to depth ratio of 1:1, and in between 75 to 100ft deep. The source is dipping at about 60° to the east and is exhibiting an apparent susceptability (k) in the range 0.0088 – 0.0130 e.g.s. units.

Assuming a similar depth of weathering in the vicinity of anomaly B, a drill hole to test the source, could be sited to intersect a target at a depth of 300ft below station 17W on line 5 south.

CONCLUSION.

The magnetometer survey at Melba Flat outlined two anomalies of interest. The anomalies are not typical of those obtained in surrounding mineral areas, but are of importance in their own right.

The first investigating drill hole was unsuccessful in establishing the cause of anomaly A, because of deep weathering effects. The second drill hole should interest the source below this level.

The drill hole outlined in this report to investigate the source of anomaly D has been sited considering weathering effects. However, the drill target should be reconsidered with results from the current hole and any necessary changes should be made.

S. S. Webster.
Geophysicist

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LIST OF PLATES

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EZCo Expln Dept Ae M 1112

PLATE 1

PART OF ZEEHAN

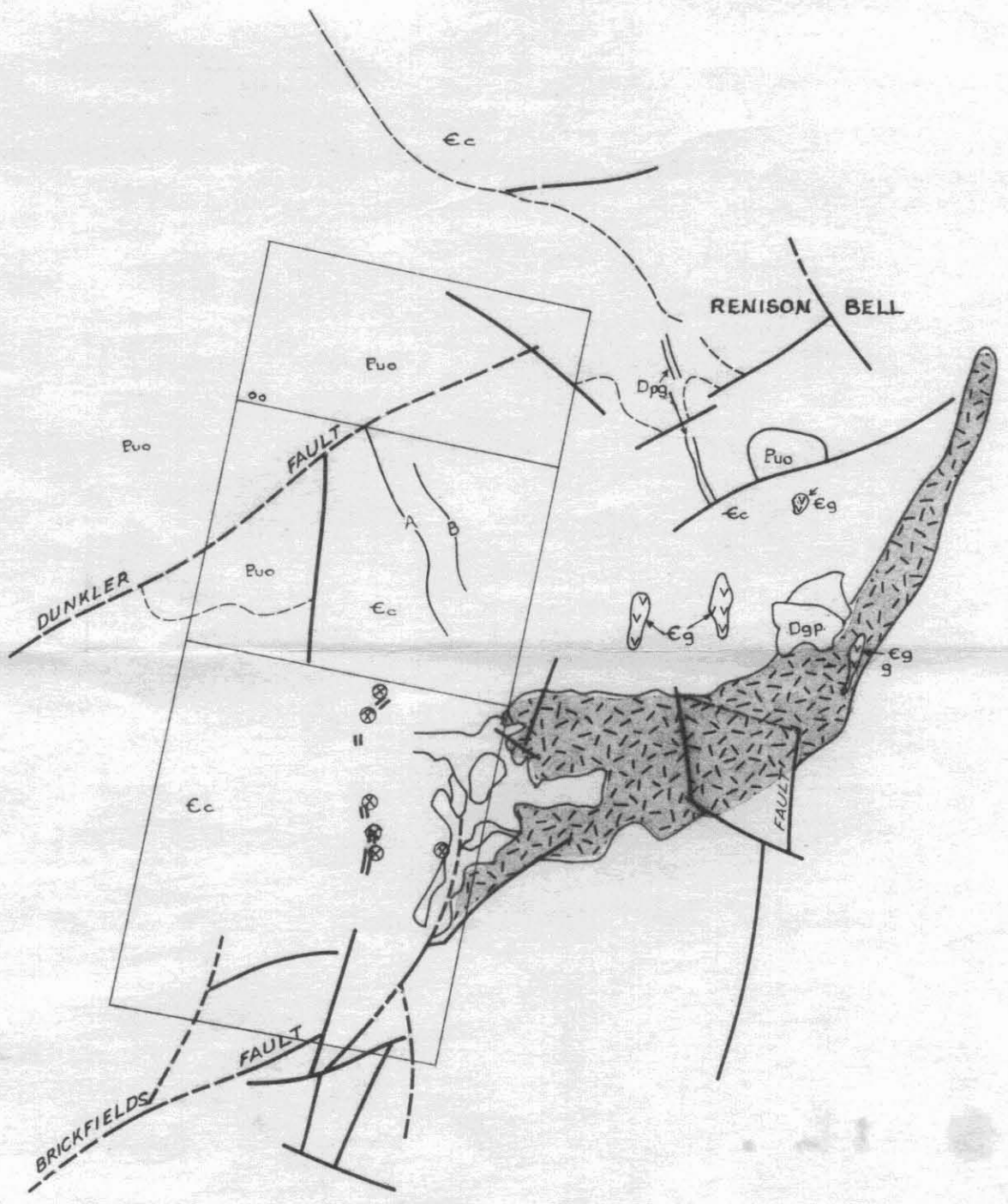
Geological Map 1 mile = 1 inch

SHOWING

MELBA FLAT MAGNETIC GRID & SURROUNDING GEOLOGY

149C14

340 — 20' — 41°45' — 145°30' — 41°45'



840 — 340

POSITION OF MAGNETIC ANOMALIES (A)

REFERENCE

- Es Cambrian Serpentine.
- Eg Cambrian Gabbro.
- Cu - Ni bearing basic Rock
- Geological boundary
- Fault
- Mine

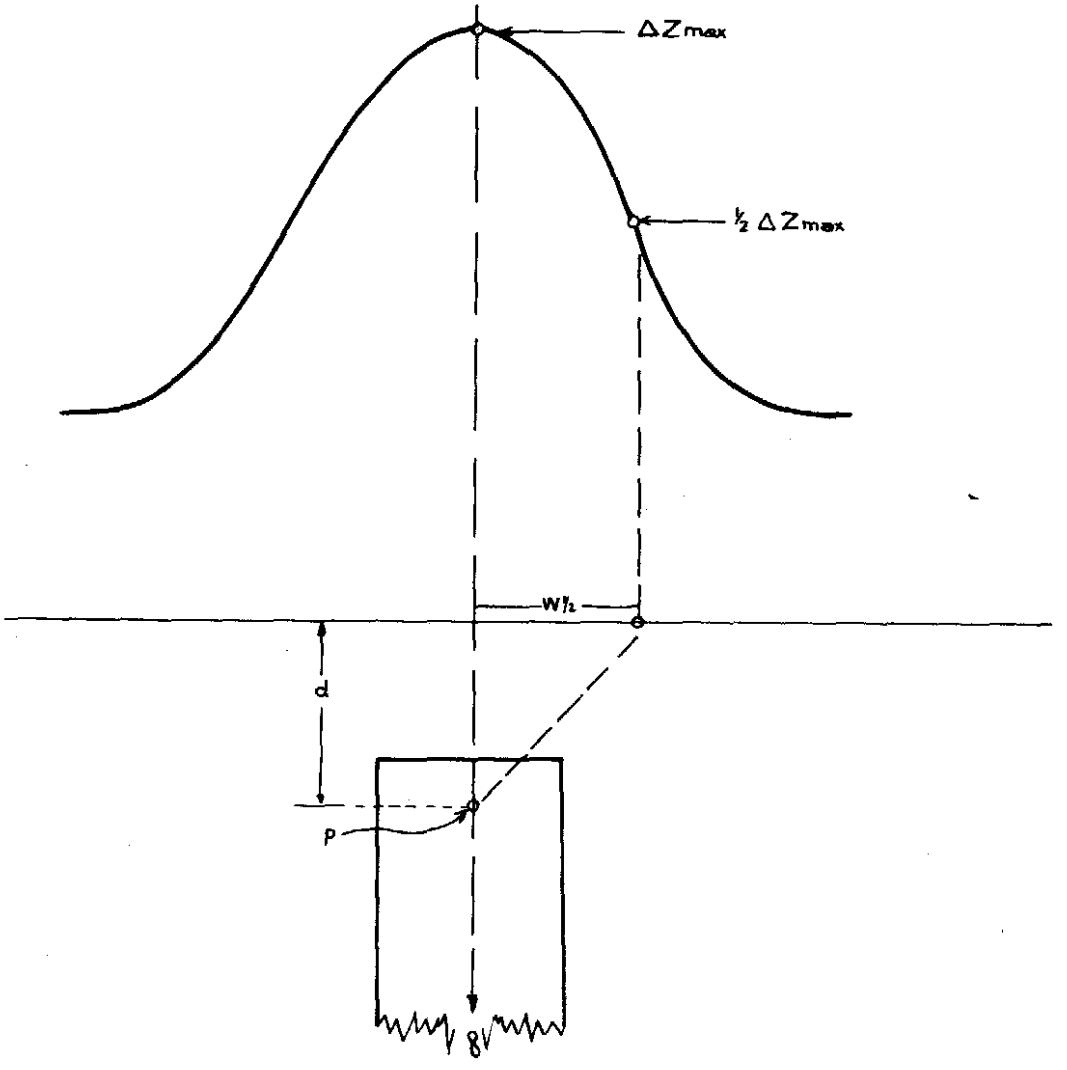
Scale in Miles

0 1 2 3

5 cm

55'

Drawn: V.P.B. 17-5-67



5 cm

VERTICAL INTENSITY ANOMALY CURVE FOR CALCULATIONS OF DEPTH TO POINT POLE
after "JAKOSKY"
V.P.B. 6-67

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PLATE 3

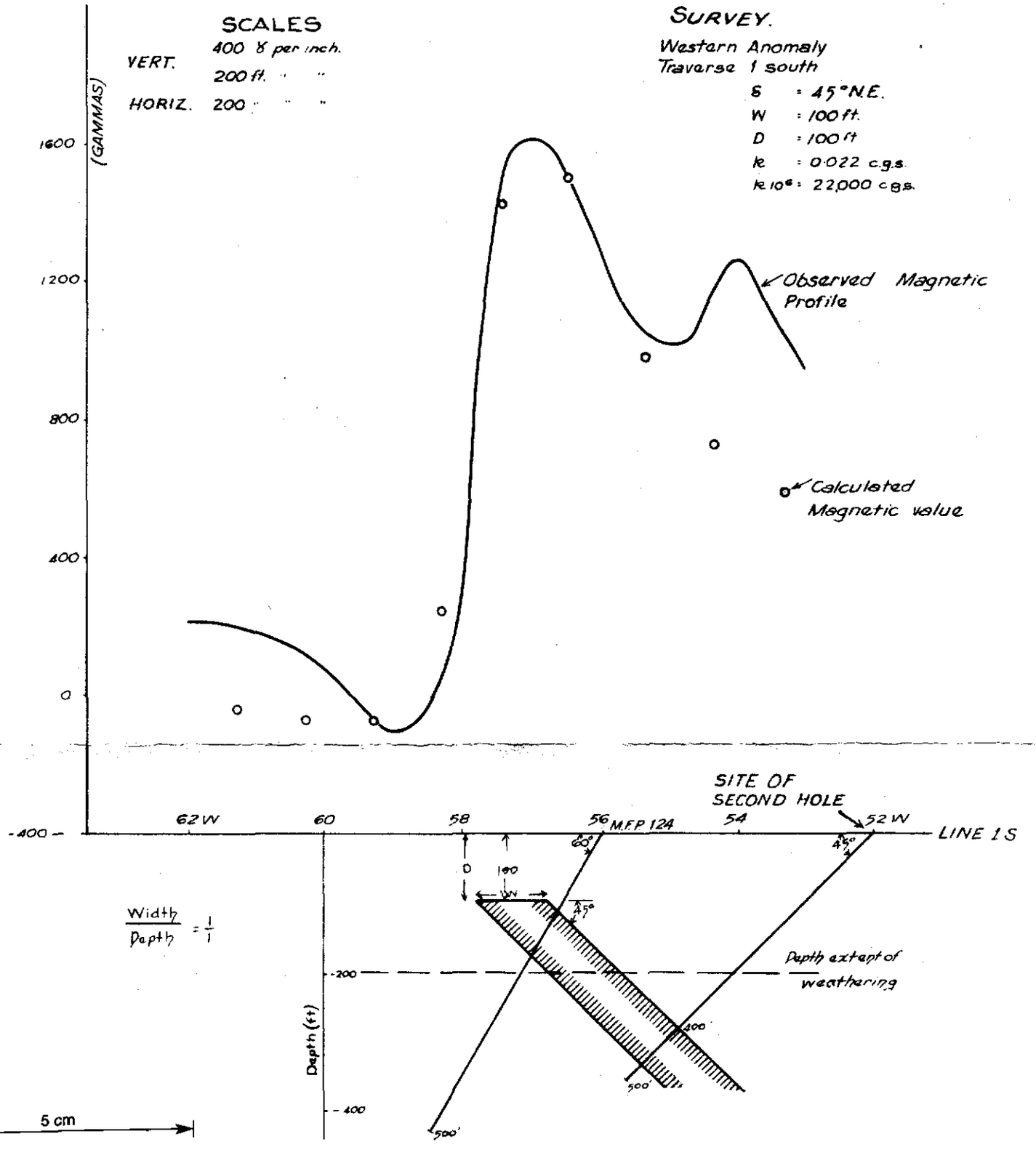
PLAN SHOWING INTERPRETATED POSITION OF ANOMALOUS BODY IN RELATION TO MAGNETIC DATA & BORE HOLES.

MELBA FLAT MAGNETIC SURVEY.

Western Anomaly
Traverse 1 south

S = 45° N.E.
W = 100 ft.
D = 100 ft
k = 0·022 c.g.s.
k.10⁶ = 22,000 c.g.s.

SCALES
VERT. 400 γ per inch.
200 ft. " "
HORIZ. 200 " " "



V.P.B 6-67

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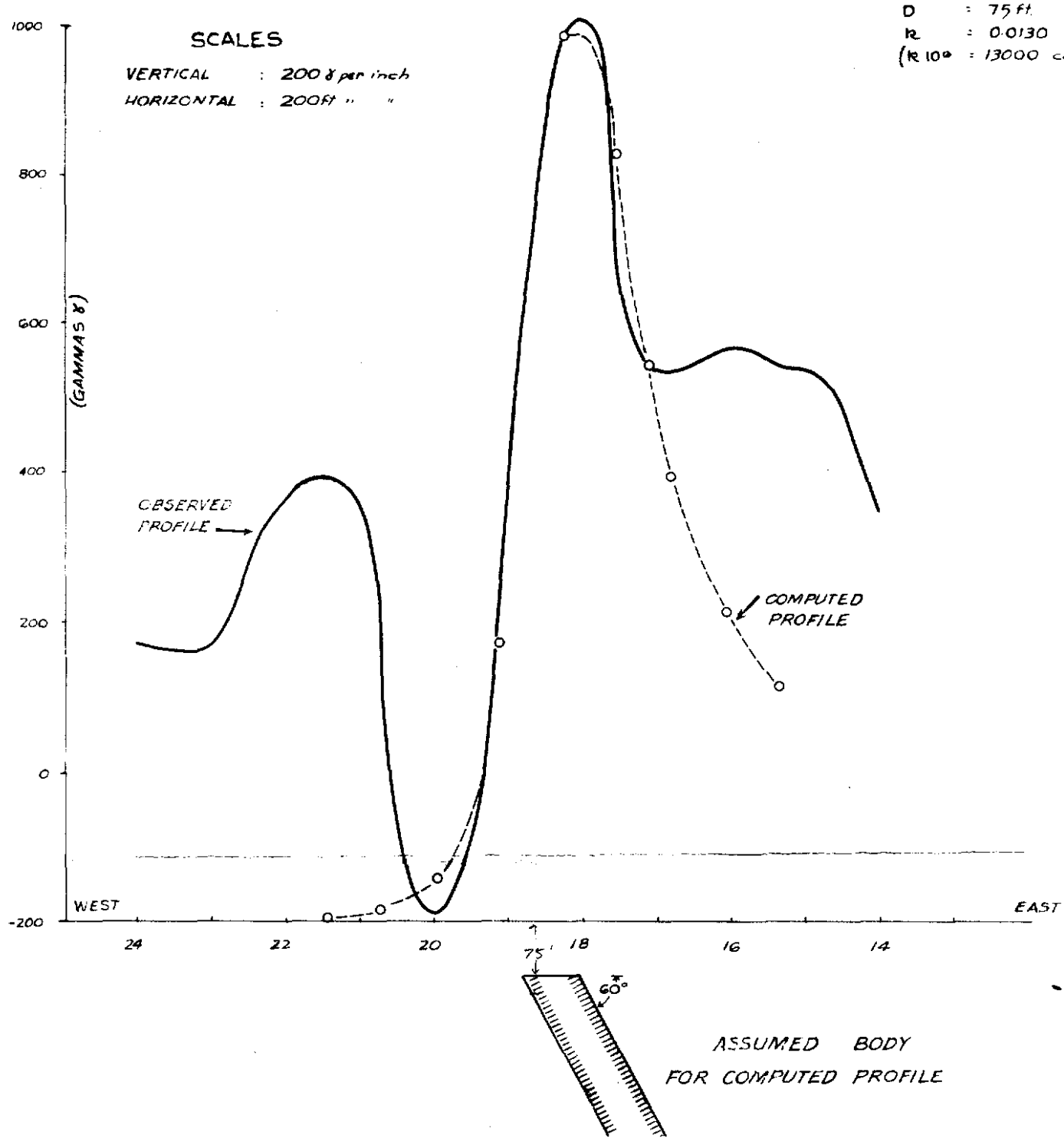
MELBA FLAT MAGNETICS
EASTERN ANOMALY
Travers G South

G = 60° NE
W = 75 ft
D = 75 ft
k = 0.0130
(k 10⁶ = 13000 cgs)



5 cm

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PLATE 5

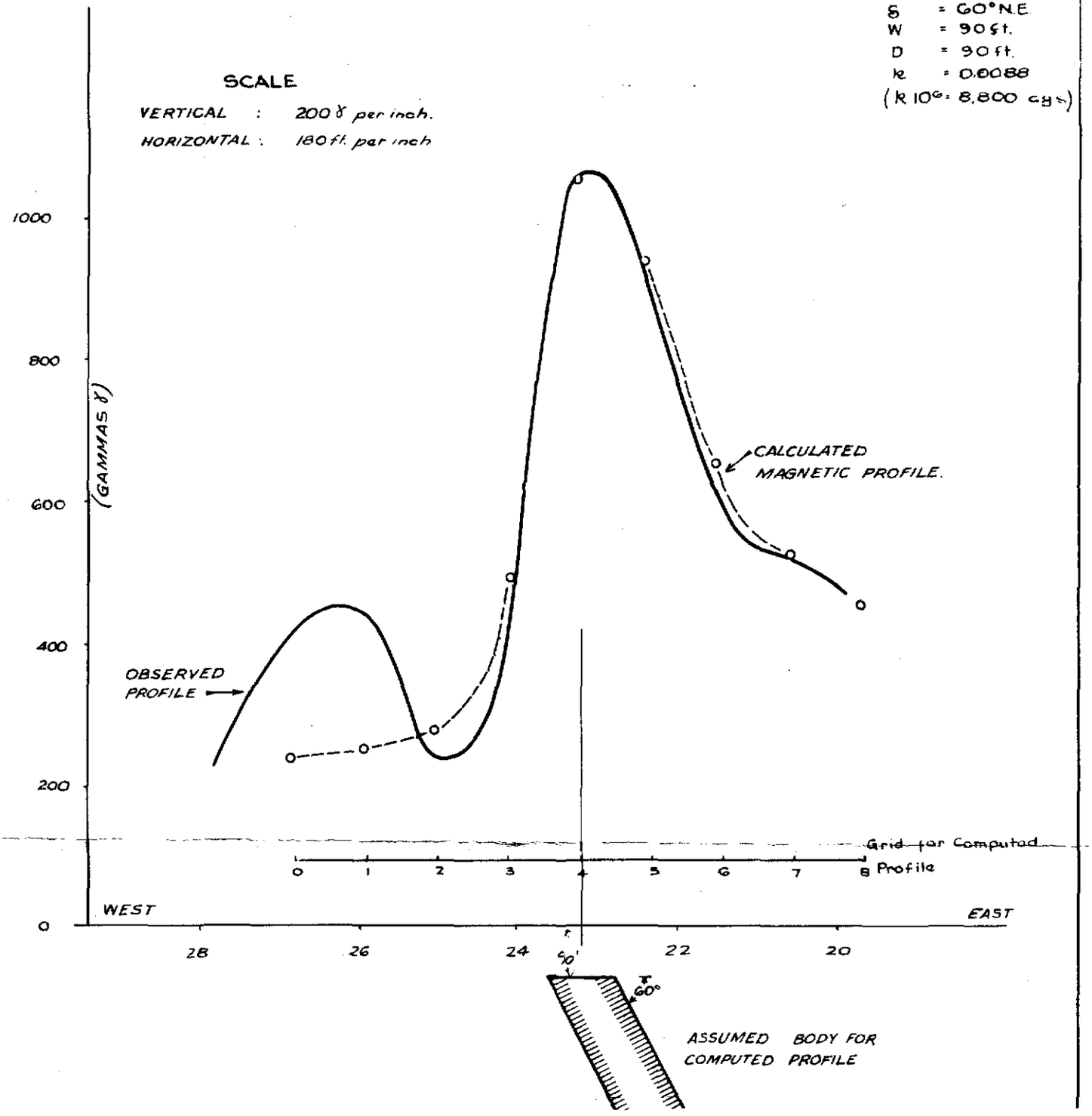
MELBA FLAT MAGNETICS
EASTERN ANOMALY
Traverse 5 South.

δ = 60° N.E.
W = 90 ft.
D = 90 ft.
k = 0.0088
(k 10^6 = 8,800 cgs)

SCALE

VERTICAL : 200 γ per inch.

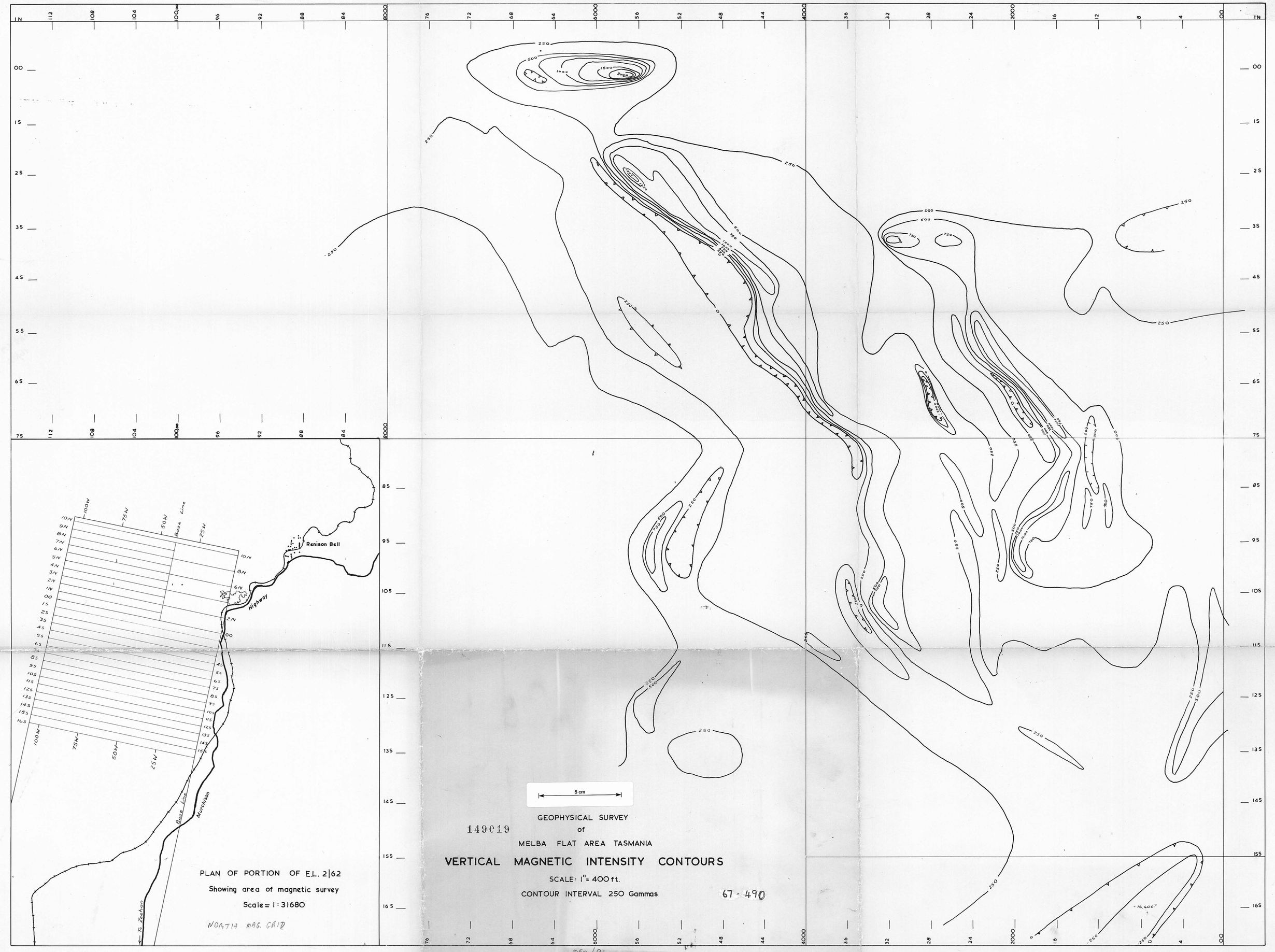
HORIZONTAL : 180 ft. per inch

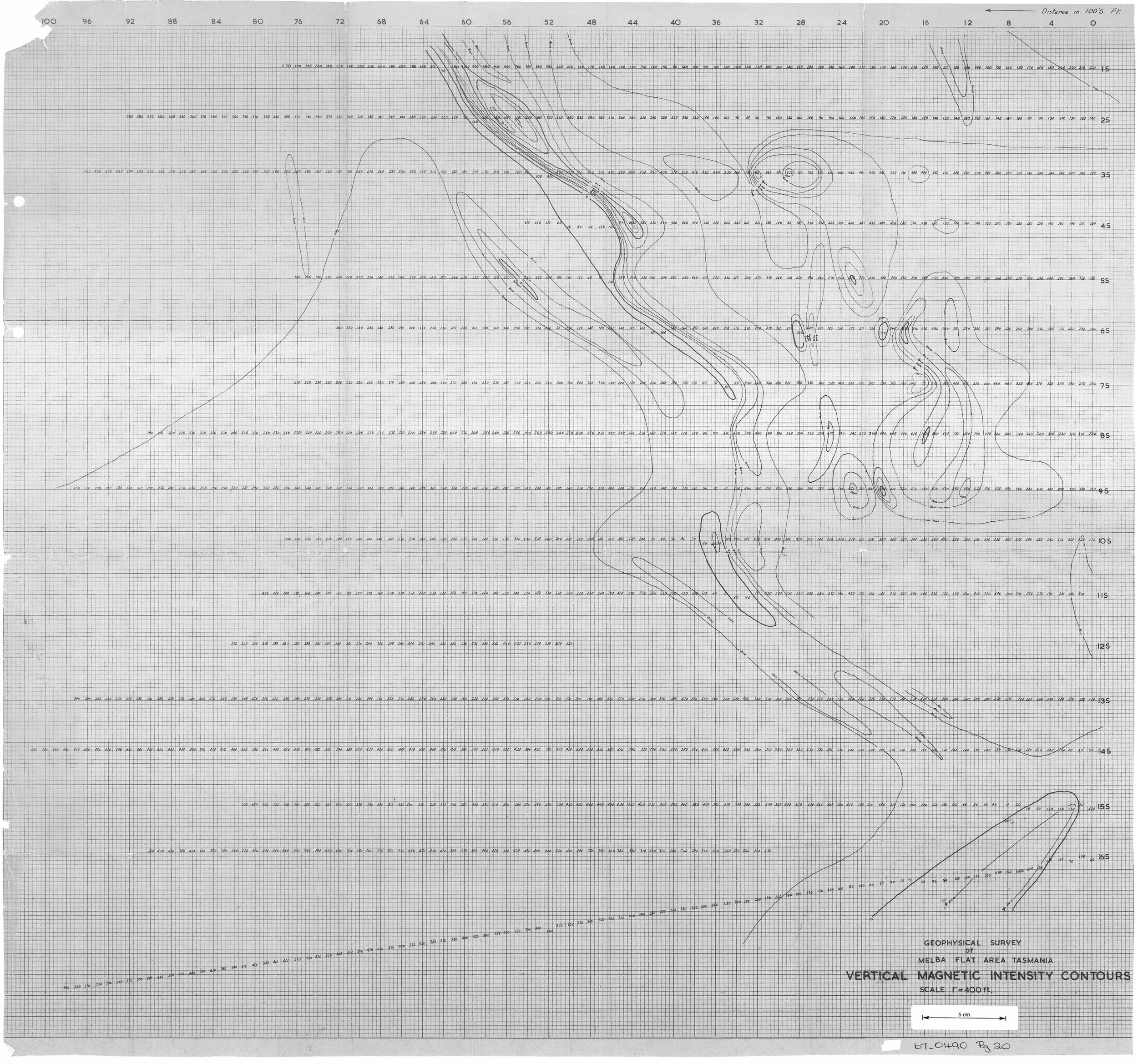


5 cm

V.P.B 6-67

E.Z. Co. Expln. Dept. AeM 1168.


Renison Bell
Highway
Base Line
Murchison
To Zeehan
PLAN OF PORTION OF E.L. 2/62
Showing area of magnetic survey
Scale = 1:31680
NORTH MAG. GRID
5 cm
149019
GEOPHYSICAL SURVEY
of
MELBA FLAT AREA TASMANIA
VERTICAL MAGNETIC INTENSITY CONTOURS
SCALE: 1" = 400 ft.
CONTOUR INTERVAL 250 Gammas
67 - 490
050/91
Plate 6



GEOPHYSICAL SURVEY
of
MELBA FLAT AREA TASMANIA

VERTICAL MAGNETIC INTENSITY CONTOURS

SCALE 1" = 400 ft.

5 cm

67-0490 Pg 20

3800 E

4000 E

4200 E

400

500

600

700

800

South Cuni shaft

MFP 112

LEGEND

Sedimentary

- Overburden
- Crimson Creek Formation
  - Siltstone
  - Shale
  - Interbedded sandstone and siltstone
  - Interbedded mudstone and shale
  - Slate

Igneous

- Basic — ultrabasic

67-0490 Pg 21

5 cm

MELBA FLAT AREA

SOUTH CUNI

Tasmania

M.F.P. 112

Scale: 1" = 40'

Date: 21·2·66

E.Z.Co. W.C.D. Geol. Dept. X.O. 190

3800 E

4000 E

4200 E

4400 E

400'

400'

600'

800'

800'

3800 E

4000 E

4200 E

4400 E

M F P 113

Crimson Creek Formation

LEGEND

Sedimentary

- Siltstone
- Shale
- Slate
- Sandstone
- Mudstone
- Interbedded sandstone and siltstone
- Interbedded slate and siltstone
- Interbedded sandstone and slate

Igneous

- Basic — Ultrabasic

67-0490 Pg 22

5 cm

MELBA FLAT AREA

SOUTH CUNI

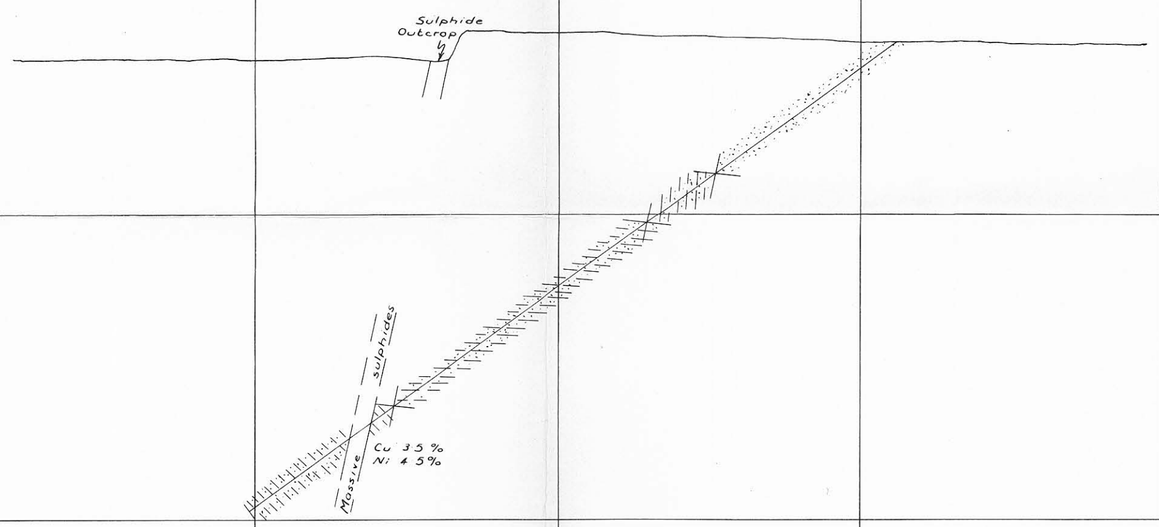
Tasmania

M.F.P. 113

Scale: 1" = 40'

Date: 23·2·66

E.Z. Co. W.C.D. Geol. Dept. XO. 191.



LEGEND

- Sandstone
- Siltstone
- Interbedded sandstone and siltstone
- Interbedded sandstone and mudstone
- Interbedded sandstone and slate

67_0490 Pg 23

5 cm

MELBA FLAT AREA

NICKEL REWARD

Tasmania

M.F.P. 114

Scale: 1" = 20'

Date: 10·2·66

E.Z.Co. W.C.D. Geol. Dept. X.O. 188.